

Final Review 1

1) Identify the family and sketch a graph for each function below.

- a) $f(x) = a(x - h)^2 + k$
- b) $f(x) = a\sqrt{x - h} + k$
- c) $f(x) = a\sqrt{1 - (x - h)^2} + k$
- d) $f(x) = a|x - h| + k$

2) Describe the effect of each variable (a, h, k) on the functions in #1

3) Given a parabola with a vertex at (3, -5) and passing through points (4, -3) and (2, -3),

- a) Write the equation for the quadratic in vertex form.
- b) Write the equation for the quadratic in polynomial form.
- c) Write the equation for the quadratic in factored form.
- d) Find the roots of the quadratic.

4) Given the function $f(x) = 3(x - 2)^2 + 1$

- a) Sketch a graph of the function without using your calculator.
- b) Write the polynomial form of the function.
- c) Write the factored form of the function.
- d) Find the roots and vertex of the quadratic.

5) Solve for x using logarithms.

a) $8^x = 20$

b) $\log_3(30) = x$

6) You invest \$2,000 in an account that earns 6.5% APR compounded quarterly.

- a) Write an equation that models your investment.
- b) Find the value of the investment after 20 years.
- c) How long will it take to grow the investment to \$10,000?
- d) What rate will double your investment in 7 years?

7) Find the equation of each graph described.

- a) A square root function that extends left starting at (3, 1) and passing through the point (2, 2).
- b) A semi-circle with endpoints at (-1, -2) and (-5, -2) and a top point of (-3, 3).
- c) An absolute value function opening downwards with a vertex of (2, 1) and passing through points (0, 0) and (4, 0).

8) Give the domain and range for each function in problem #7.

9) Find the roots (zeros), both real and imaginary, and the vertex of each equation. Show all your work.

- a) $y = 2(x + 1)(x - 3)$
- b) $y = 3x^2 - 14x - 5$
- c) $y = -2(x - 3)^2 - 3$

10) If $f(x)$ is a linear function, write both the point-slope and the slope-intercept equations in function notation for the following points: $f(2) = -3$ and $f(-1) = 6$.

- a) Use either of your equations to evaluate $f(7)$.
- b) Find x when $f(x) = 4$.

Answers Algebra 2 Review 1:

- 1)
 - a) Parabola or Quadratic
 - b) Square Root
 - c) Semi-Circle
 - d) Absolute Value
- 2)

The variable a stretches or compresses the graph
The variable h moves the graph right or left
The variable k moves the graph up or down
- 3)
 - a) $f(x) = 2(x - 3)^2 - 5$
 - b) $f(x) = 2x^2 - 12x + 13$
 - c) $f(x) = 2(x - 4.58)(x - 1.41)$
 - d) 4.58 and 1.41, $3 \pm \frac{\sqrt{10}}{2}$
- 4)
 - a) The graph is a parabola stretched by 3, with a vertex at (2, 1)
 - b) $f(x) = 3x^2 - 12x + 13$
 - c) $3(x - (2 - \frac{\sqrt{3}}{3}i))(x - (2 + \frac{\sqrt{3}}{3}i))$
 - d) $2 \pm \frac{\sqrt{3}}{3}i$
- 5)
 - a) $x \approx 1.44$
 - b) $3^x = 30$ so $x \approx 3.096$
- 6)
 - a) $y = 2,000(1 + 0.065/4)^x$
 - b) \$7,262.31
 - c) 99.85 quarters or about 25 years
 - d) $\approx 10.03\%$
- 7)
 - a) Square root function, $y = \sqrt{x - 3} + 1$
 - b) Semi-circle, $y = 5\sqrt{1 - ((x + 3)/2)^2} - 2$
 - c) Absolute Value, $y = 0.5(\text{abs}(x - 2)) + 1$
- 8)
 - a) domain $(-\infty \leq x \leq 3)$ range $(1 \leq y \leq \infty)$
 - b) domain $(-5 \leq x \leq -1)$ range $(-2 \leq y \leq 3)$
 - c) domain $(-\infty \leq x \leq \infty)$ $(-\infty \leq y \leq 1)$
- 9)
 - a) $x = -1$ and 3
 - b) $x = 5$, -0.3333
 - c)
- 10)

Point slope: $y = -3(x - 2) - 3$ or $y = -3(x + 1) + 6$
Slope intercept: $y = -3x + 3$

 - a) $f(7) = -18$
 - b) $f(-1/3) = 4$